H8/3864 Series
QFP-80A
User System Interface Cable
(HS3864ECH61H)
for E6000 Emulator

User's Manual

RENESAS

HS3864ECH61HE(D)

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Preface

Thank you for purchasing this user system interface cable (HS3864ECH61H) for the Renesas's original microcomputer H8/3864 series and H8/3887 series.

The HS3864ECH61H is a user system interface cable that connects an H8/3864 series, H8/3887 series E6000 emulator (HS3880EPI60H; hereinafter referred to as the emulator) to the IC socket for a QFP-80A package (package code: FP-80A) for the H8/3864 series MCU on the user system.

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Section 1 Configuration

CAUTION

Use an IC149-080-017-B5 socket (manufactured by YAMAICHI ELECTRONICS Co., Ltd.) for the FP-80A package IC socket on the user system.

Figure 1 shows the configuration of the HS3864ECH61H user system interface cable for the FP-80A package.

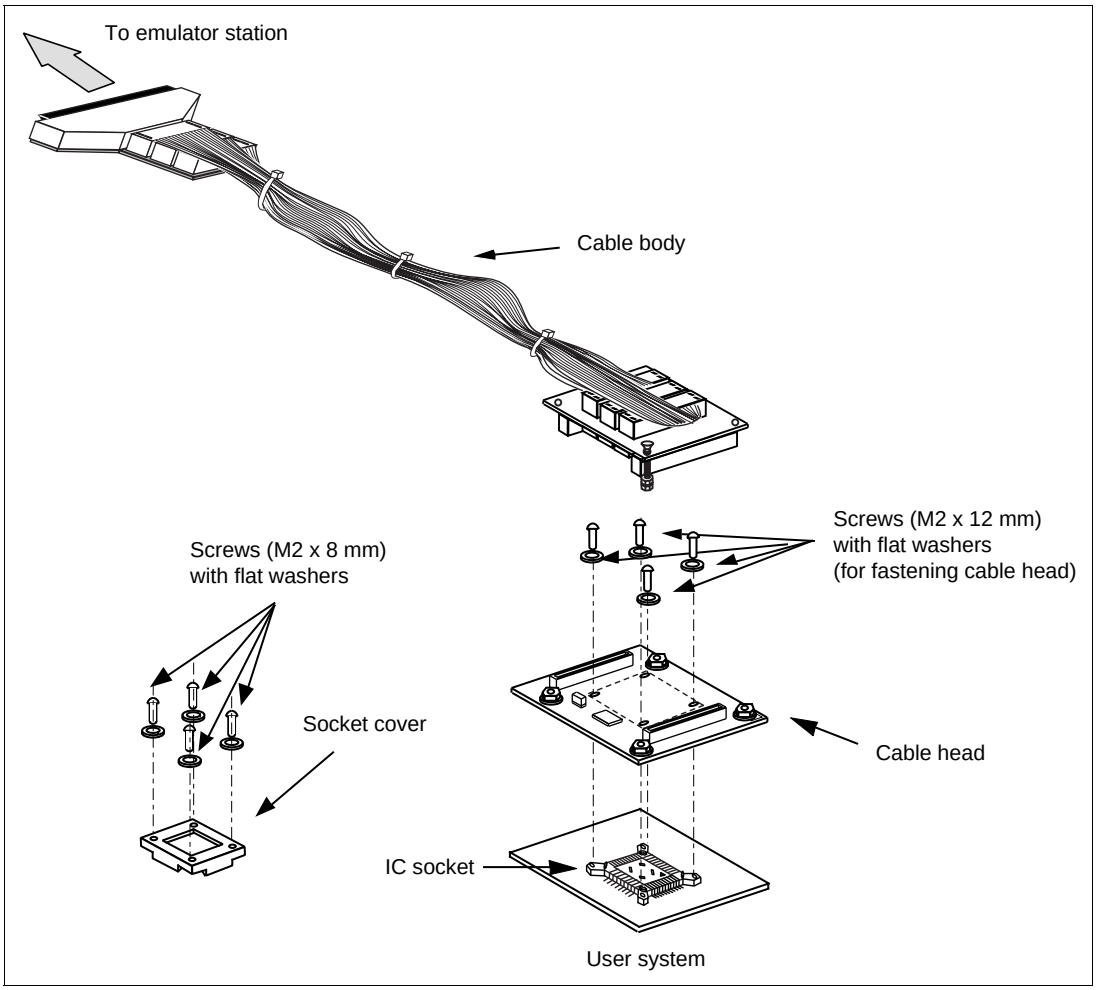

Figure 1 HS3864ECH61H User System Interface Cable

Table 1 lists the HS3864ECH61H components. Please make sure you have all of these components when unpacking.

Table 1 HS3864ECH61H Components

No.	Component	Quantity	Remarks
1	Cable body	1	Includes flat cable
2	Cable head	1	
3	IC socket	1	For the FP-80A package
4	Socket cover	1	For installing an FP-80A-packaged MCU
5	Screws (M2 x 12 mm)	4	For fastening cable head
6	Screws (M2 x 8 mm)	4	For installing an FP-80A-packaged MCU (with four flat washers)
7	Documentation	1	User's manual for HS3864ECH61H (this manual)

Section 2 Connection Procedures

2.1 Connecting User System Interface Cable to Emulator Station

⚠ WARNING

Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE CABLE is connected to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned. Failure to do so will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

To connect the cable body to the emulator station, follow the instructions below.

1. Make sure the user system and emulator station are turned off.
2. After making sure the direction of the cable body connector is correct, firmly insert the cable body connector into the emulator station socket (figure 2).

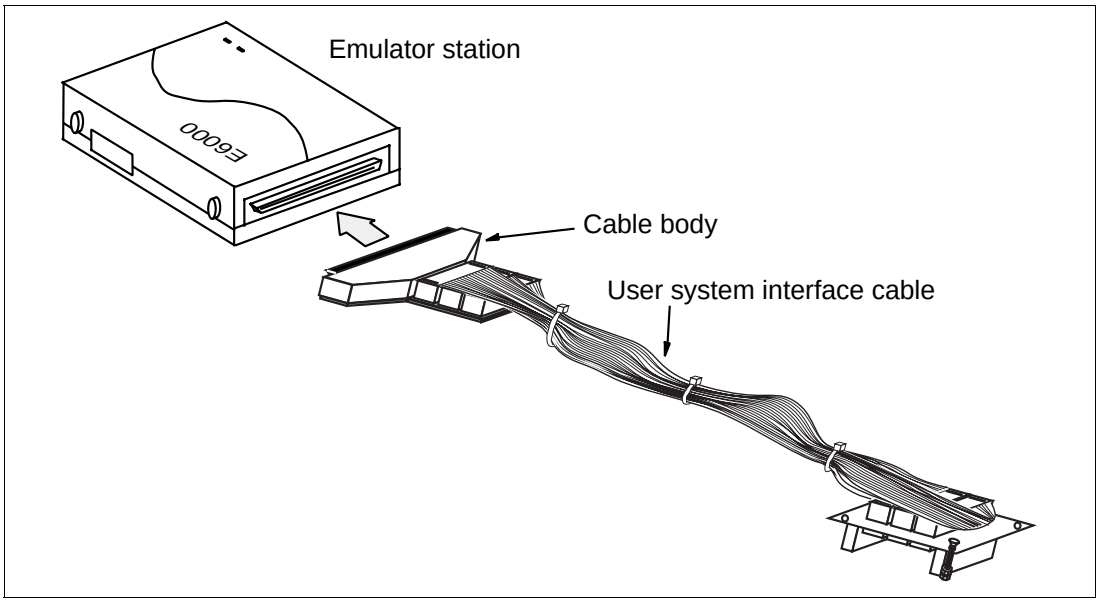

Figure 2 Connecting User System Interface Cable to Emulator Station

2.2 Connecting User System Interface Cable to User System

⚠ WARNING

Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE CABLE is connected to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned. Failure to do so will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

To connect the cable head to the user system, follow the instructions below.

2.2.1 Installing IC Socket

After checking the location of pin 1 on the IC socket, apply epoxy resin adhesive to the bottom of the IC socket for an FP-80A package, and fasten it to the user system before soldering.

2.2.2 Soldering IC Socket

After fastening, solder the IC socket for an FP-80A package to the user system. Be sure to completely solder the leads so that the solder slops gently over the leads and forms solder fillets. (Use slightly more solder than the MCU.)

2.2.3 Inserting Cable Head

CAUTION

Check the location of pin 1 before inserting.

Align pin 1 on the IC socket for an FP-80A package on the user system with pin 1 on the user system interface cable head, and insert the user system interface cable head into the IC socket on the user system, as shown in figure 3.

2.2.4 Fastening Cable Head

CAUTION

1. **Use a Phillips-type screwdriver whose head matches the screw head.**
2. **The tightening torque must be 0.0785 N•m or less. If the applied torque cannot be accurately measured, stop tightening when the force required to turn the screw becomes significantly greater than that needed when first tightening. If a screw is tightened too much, the screw head may break or an IC socket contact error may be caused by a crack in the IC socket solder.**
3. **If the emulator does not operate correctly, cracks might have occurred in the solder. Check conduction with a tester and re-solder the IC socket if necessary.**

Fasten the user system interface cable head to the IC socket for an FP-80A package on the user system with the four screws (M2 x 12 mm; with four flat washers) provided. Each screw should be tightened a little at a time, alternating between screws on opposing corners. Take special care, such as manually securing the IC socket soldered area, to prevent the soldered IC socket from being damaged by overtightening the screws or twisting the components.

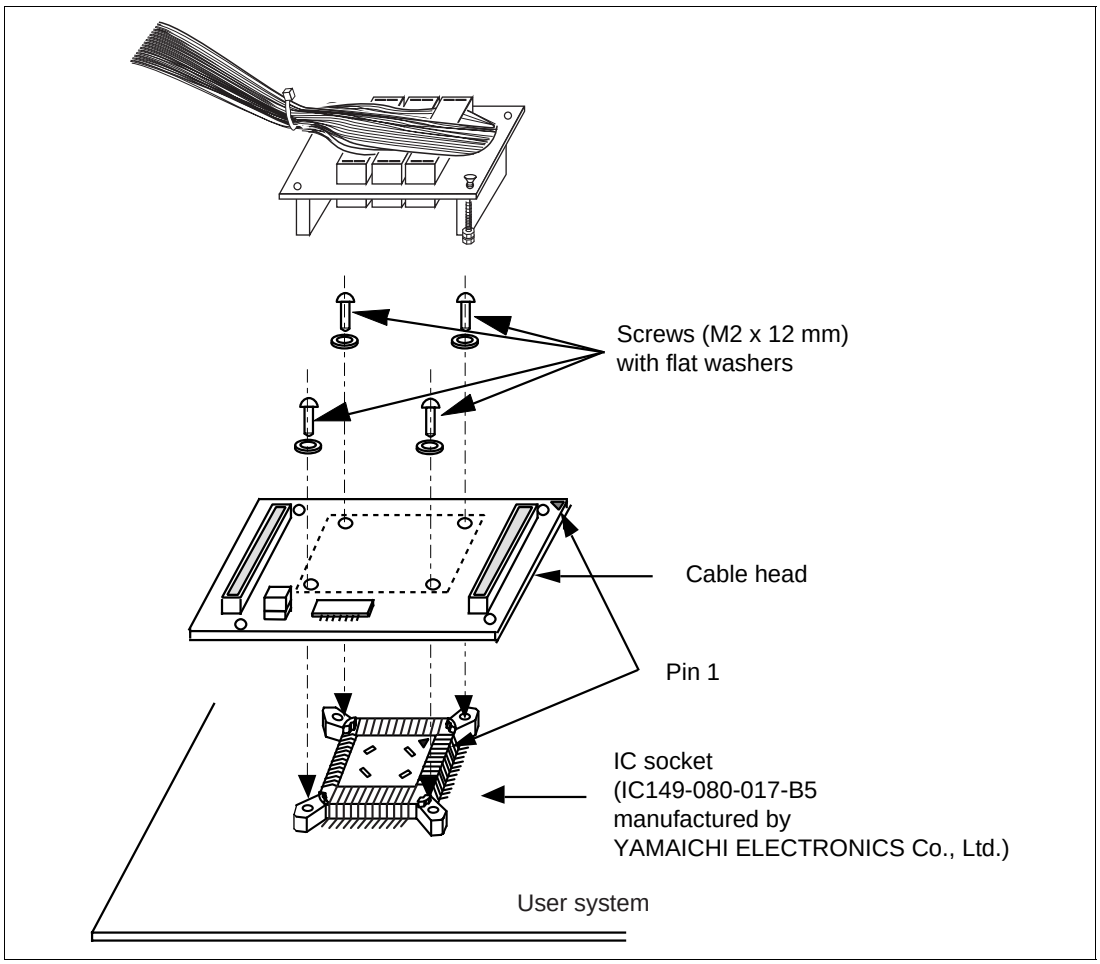

Figure 3 Connecting User System Interface Cable to User System

2.2.5 Connecting Cable Body to Cable Head

Connect the cable body to the cable head.

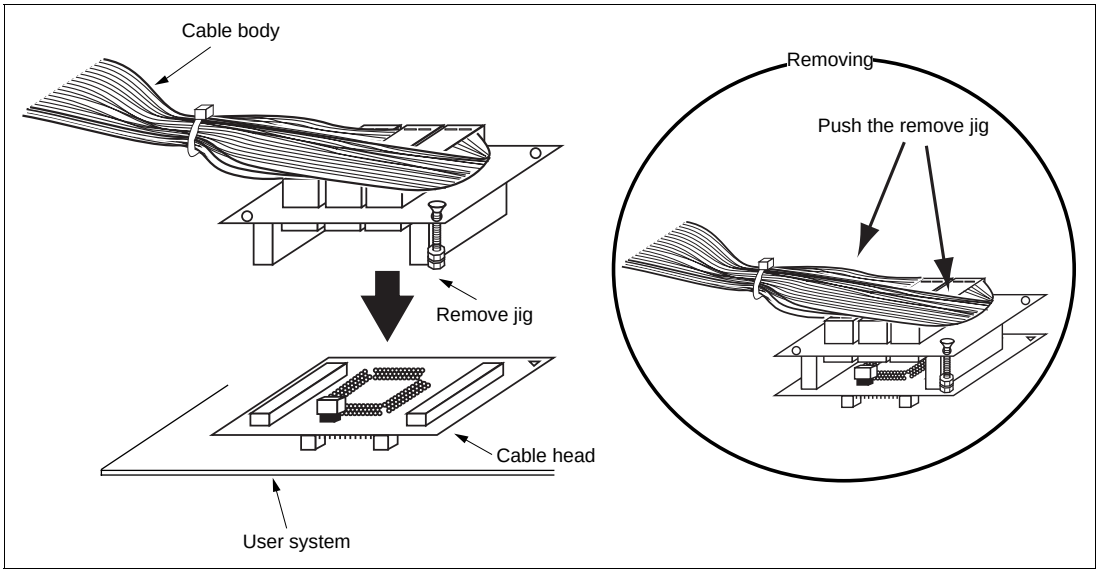

Figure 4 Fastening Cable Body

2.3 Recommended Dimensions for User System Mount Pad

Figure 5 shows the recommended dimensions for the mount pad (footprint) for the user system with an IC socket for an FP-80A package (IC149-080-017-B5: manufactured by YAMAICHI ELECTRONICS Co., Ltd.). Note that the dimensions in figure 5 are somewhat different from those of the actual chip's mount pad.

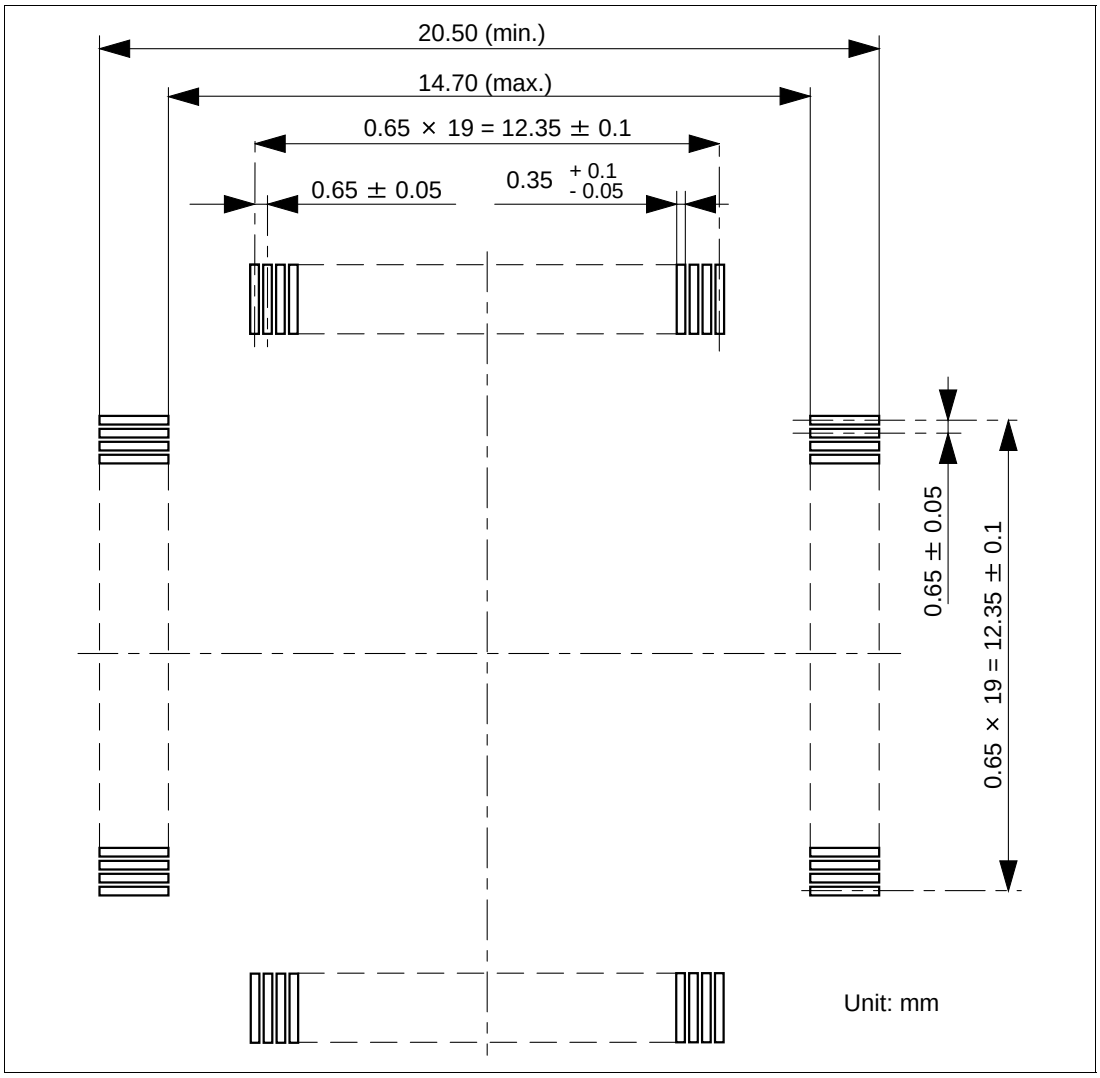

Figure 5 Recommended Dimensions for Mount Pad

2.4 Dimensions for User System Interface Cable Head

The dimensions for the user system interface cable head are shown in figure 6.

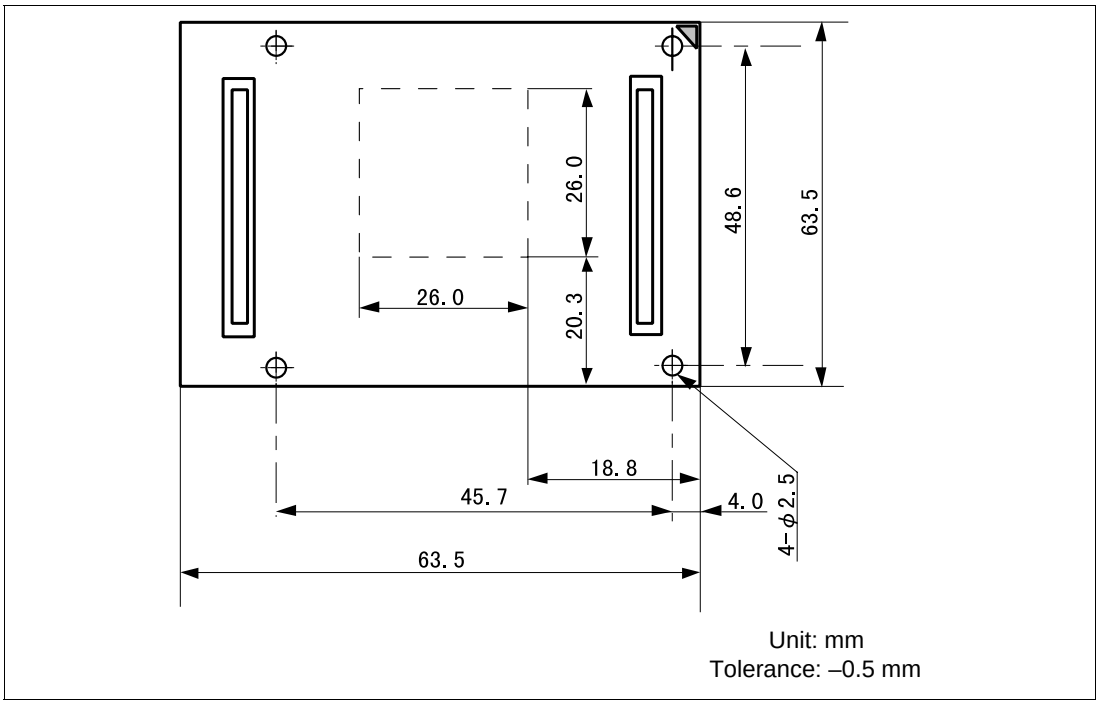

Figure 6 Dimensions for User System Interface Cable Head

2.5 Resulting Dimensions after Connecting User System Interface Cable

The resulting dimensions, after connecting the user system interface cable head to the user system, are shown in figure 7.

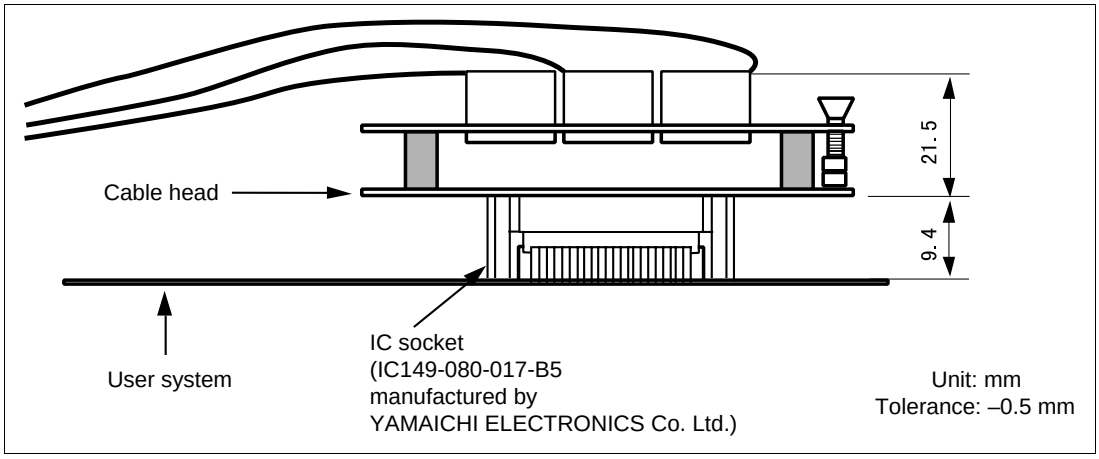

Figure 7 Resulting Dimensions after Connecting User System Interface Cable

Section 3 Installing the MCU to the User System

CAUTION

1. **Check the location of pin 1 before inserting.**
2. **Use a Phillips-type screwdriver whose head matches the screw head.**
3. **The tightening torque must be 0.0785 N•m or less. If the applied torque cannot be accurately measured, stop tightening when the force required to turn the screw becomes significantly greater than that needed when first tightening. If a screw is tightened too much, the screw head may break or an IC socket contact error may be caused by a crack in the IC socket solder.**
4. **If the MCU does not operate correctly, cracks might have occurred in the solder. Check conduction with a tester and re-solder the IC socket if necessary.**

Check the location of pin 1 before inserting the MCU into the IC socket on the user system, as shown in figure 8. After inserting the MCU, fasten the socket cover with the provided four screws (M2 x 8 mm; with four flat washers). Take special care, such as manually securing the IC socket soldered area, to prevent the IC socket from being damaged by overtightening the screws or twisting the components.

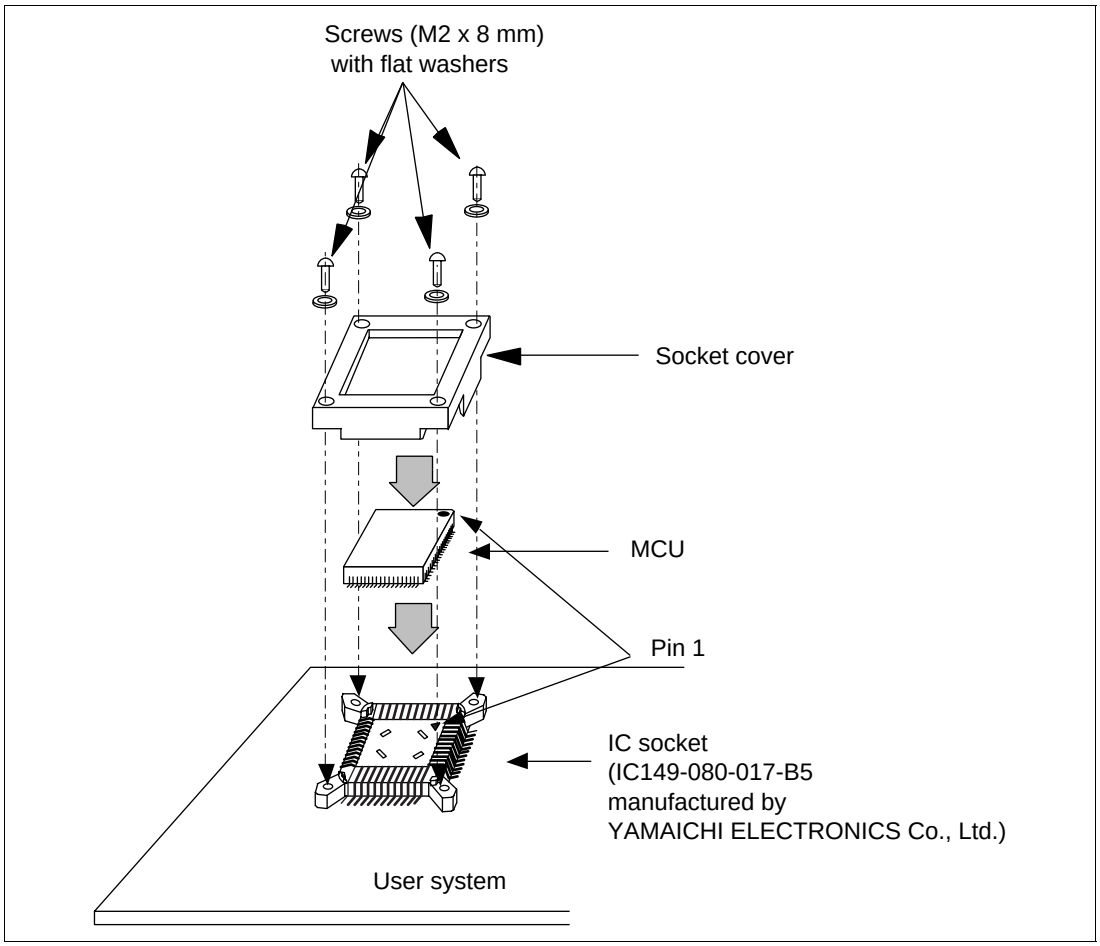

Figure 8 Installing MCU to User System

Section 4 Verifying Operation

1. When using the H8/3864 series, H8/3887 series E6000 emulator (HS3880EPI60H), turn on the emulator according to the procedures described in the H8/3864 series, H8/3887 series E6000 Emulator User's Manual (HS3880EPI60HE).
2. Verify the user system interface cable connections by accessing ports and checking the bus states of the pins. If an error is detected, recheck the soldered IC socket and the location of pin 1.
3. The emulator connected to this user system interface cable supports two kinds of clock sources: an emulator internal clock and an external clock on the user system, for the MCU clock and subclock. For details, refer to the H8/3864 series, H8/3887 series E6000 Emulator User's Manual (HS3880EPI60HE).
   - To use the emulator internal clock

     Select the clock in the emulator station as the system clock (ϕ) and the subclock (ϕw), by using the CLOCK command (emulator command).
   - To use the external clock on the user system as the system clock

     Select target clock t2 with the CLOCK command (emulator command). Supply the external clock from the user system to the emulator. When a crystal oscillator is inserted into the OSC1 and OSC2 terminals for the system clock, the colck is generated by the oscillator circuits shown in figure 9. To input an external clock from the user system, input clock pulses satisfying the specifications described in the MCU hardware manual into the OSC1 terminal. The system clock (ϕ) frequency is half of the external clock frequency.
   - To use the external clock on the user system as the subclock

     Select target clock sub t with the CLOCK command (emulator command). Supply the external clock from the user system to the emulator. To input an external subclock from the user system, input clock pulses satisfying the specifications shown in figure 9 into the X1 terminal. The oscillator circuits on the user system interface cable cannot generate external subclock pulses by using the crystal oscillator connected to the user system.

Figure 9 shows the system clock oscillator on the user system interface cable and the subclock input specifications.

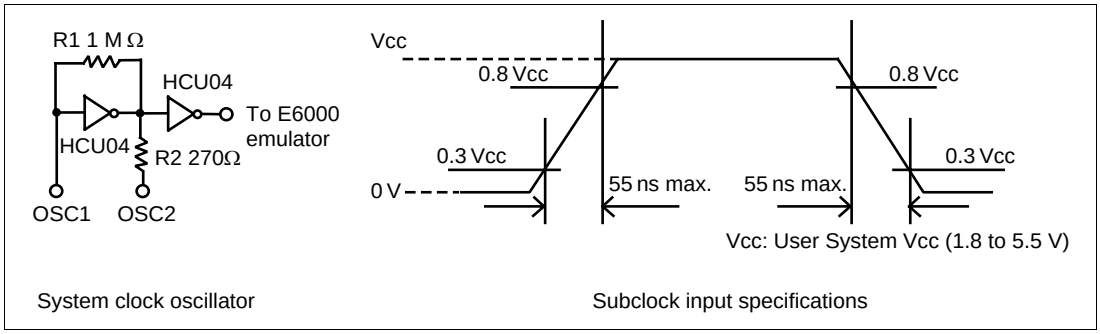

Figure 9 System Clock Oscillator and Subclock Input Specifications

Section 5 Notice

1. Make sure that pin 1 on the user system IC socket is correctly aligned with pin 1 on the cable head before inserting the cable head into the user system IC socket.
2. The dimensions of the recommended mount pad for the user system IC socket are different from those of the MCU.
3. This user system interface cable is specifically designed for the HS3880EPI60H emulator. Do not use this cable with any other emulator station.
4. To prevent breaking of wires in the cable body, do not place heavy or sharp metal objects on the user system interface cable.
5. While the emulator station is connected to the user system with the user system interface cable, force must not be applied to the cable head. Place the emulator station, user system interface cable, and user system as shown in the example in figure 10.

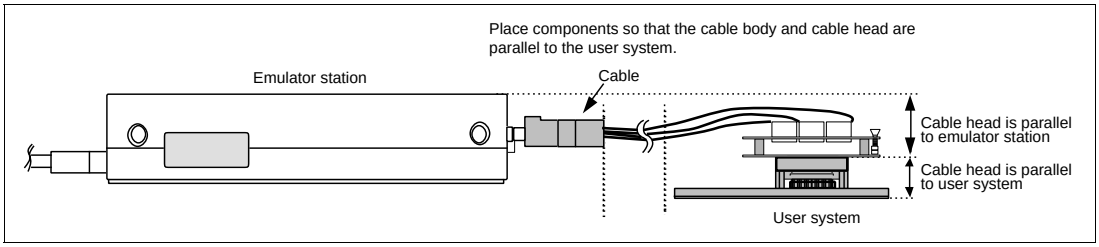
Place components so that the cable body and cable head are parallel to the user system.
Emulator station
Cable
Cable head is parallel to emulator station
Cable head is parallel to user system
User system

Figure 10 User System Interface Cable Location Example

6. The P1 short connector is used for testing. Do not remove the short pins that are inserted in the sides of pin 1 and pin 2.

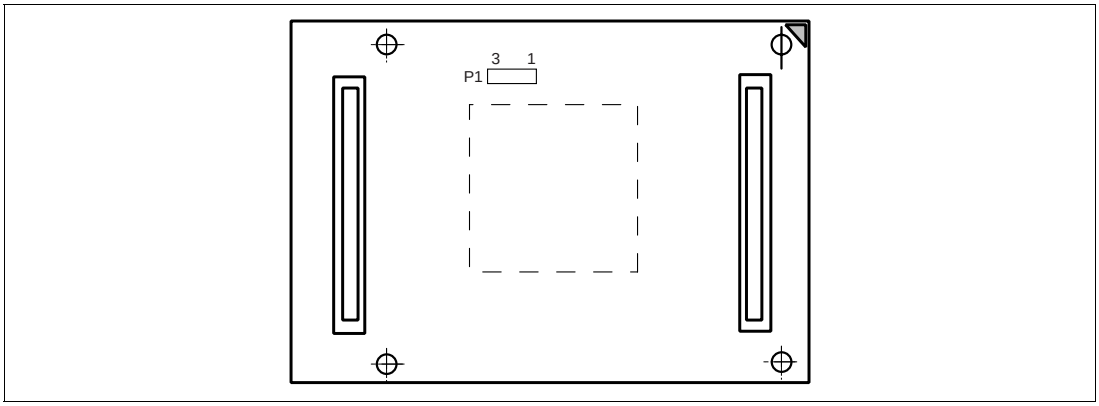

Figure 11 P1 Short Connector